Models and Strategies Towards a Canadian On-line Education Infrastructure

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By Terry Anderson and Stephen Downes

Executive Summary
The Canadian adult education system is challenged by opportunity and threat arising from a new model of education provision. Education is based upon creating and distributing knowledge through individual and group activities, study and deliberation. When the tools that support these activities radically change, we can expect radical pressure and opportunity for change in the development and delivery of education services. This report briefly reviews the forces and barriers that accompany the introduction of networked learning and teaching technologies. It then overviews five existing or emerging organizational models that are designed to support the development of on-line education. These include:

- Pan-Canadian consortia of existing institutions
- Regional consortia of institutions
- A new national, on-line education entity
- Partnerships between private on-line enablers and public institutions and
- A Canadian portal for on-line learning

Each model already exists in some form and each provides certain advantage, opportunity and threat for Canadian learners, institutions, businesses and taxpayers. Listing and discussing these models is designed to help policy makers differentiate between alternative organizational structures. Each of the models is built upon a greater degree of collaboration than currently exists between and among public and private educational institutions. A discussion of collaboration and guidelines for effective collaboration are then outlined. Finally, the report describes eight strategies designed to stimulate and strengthen the provision of on-line learning in Canada.

Strategies for support and stimulation of on-line education are needed to insure that the Canadian postsecondary system meets new technology driven challenges and opportunities. The report presents the following list of stimulations for discussion and consideration:

1. A national request for Proposals for on-line learning
2. Stimulating consumer demand for on-line learning
3. Ensuring professional competence
4. Developing a national network of support services
5. Creation of repositories of educational objects
6. Community testing and information centers
7. Competency based degrees and prior learning assessment

The report concludes by noting the change in focus from institution provision to learner choice that marks each of the models and strategies. The major hurdles of time, knowledge and money are highlighted once again, with a call to action, to marshal

resources to meet the opportunity provided to recreate the Canadian adult learning system.

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Universities are sitting at the gateway of the knowledge economy. The question is, will they leverage their intellectual capital or become a vestige of the past, talking about the way things used to be?

Greg Baroni, Manager of KPMG 's Global Education Practice

Introduction

Early Universities were built around banks of information – stored in repositories (libraries) and in the minds of faculty and students - and around opportunities for interaction between and amongst faculty and students. The technology of the Knowledge Age provides "anywhere/anytime" access to these repositories and expands the ways and means of faculty student interaction. This radical change in context provides both opportunity and threat to Canada's adult education system.

We believe that distance education using a variety of modalities, and delivered via network-based technology will become a major means of providing and acquiring adult education and training (Turoff, 1999). However, we do not believe that these forms of distributed education will replace campus-based education. Henry Ford is famously quoted as saying that the customer can buy a Model T automobile in any color – as long as it is black! To paraphrase Ford's quote, most Canadian postsecondary instructions have offered "any type of education, as long as it is campus-based".

Consumers, employers, government and taxpayers demand that the public adult education system continue to expand the variety and choice of educational experience that it offers. These alternatives need not hinder, much less destroy, public education as insinuated by some critics (Noble 1998, Winner 1998). Indeed they offer tremendous opportunity for post secondary institutions to evolve their contribution and involvement in the provision of meaningful education and training experiences.

The so-called *Knowledge Age* fundamentally changes the tools of teaching and learning. New technology demands a new vision. As Delong (1995) notes "The role of faculty then becomes to facilitate acquisition of knowledge by teaching discernment, which is getting very close to the goal that most of us longingly articulate: we want to teach students to think." Teaching becomes less the production and transmission of information and more the provision of support, inspiration, challenge, the creation of learning environments and tutoring in the use of knowledge production and communication tools.

Change of this magnitude is threatening to most Canadian postsecondary institutions, many of which are deeply committed to the preservation of pre-technologically enhanced models of practice and organization. The fundamental challenge presented by new communication and information technologies to higher education is not technological nor is it economical. Delong (1995) argued the challenge is directed towards the culture of the organization, not to its curriculum and pedagogy, but to its outlook and values. These are the values that most determine the institutions' and the nations' educational system's capacity to transform itself and thrive in an information rich context.

Three fundamental shifts that are necessary to support this transition (Delong, 1995):

1. *Professional development*: The first revolves around the practice of teachers as they learn to create and use networked based resources in their campus and distributed education programming. Many institutions are well along in this process and a rapidly growing body of technical and pedagogical support infrastructure is being created on Canadian campuses (see McMaster University 1997). Despite the increasing demands for professional support to teaching faculty, the development of easier to use and less expensive tools, enhanced search, retrieval and presentation skills and the creation of repositories of educational objects, are lowering barriers and attracting mainstream faculty to develop and use educational applications of information and communications technologies. Government and institutional incentives that support the individual transformation and adoption of learning technologies help build the capacity within the institutions for the creation and distribution of programming for both on-campus and distributed delivery.

2. *Policy reform*: Change in institutional policy and administrative practice is the second area of necessary change. The list of administrative barriers to change is extensive and grounded in a prejudice towards face-to-face, campus bound education. Systems have been created over hundreds of years to support this particular teaching and learning model. However, significant forces of change including globalization, changing demographics, restructuring of employment opportunities, technological change, demands for accountability, consumerism and rising expectations by employers, business and taxpayers (Kovel-Jarboe, 2000) are forcing us to re-conceptualize educational services as provided by publicly supported educational institutions. Canada's adult education system is large, complex and expensive and by nearly all accounts, insufficiently funded to meet the existing and expected growth in demand. How then can we expect under-funded systems to support new, unproven and often expensive alterations?

3. *Increased collaboration*: A final challenge is recognizing and implementing system wide developments so that Canada's public and private postsecondary institutions operate as an efficient and effective system, rather than a patchwork of individually orientated institutions. Can we learn to share our resources and collective skill, focusing on increasing public service rather than focusing on our individual and institutional need for preservation?

Assumptions

Forecasting and advising in any educational context is based upon a set of assumptions about how the forces of technology, organization, economy and pedagogy will become manifest in a foreseeable period of time. These are our assumptions.

- On-line education and training programs that are distributed directly to businesses, homes and mobile locations will become a major means of providing

professional development, training and full certificate and degree programming. (Oblinger and Kidwell 2,000)

- Adult Education and training will increasing become a global enterprise. Increasing numbers of both private and public educational organizations will have the capacity to deliver on-line learning opportunities and will be targeting the Canadian market, thus increasing competition. Opportunities to provide Canadian training and education to foreign learners, governments and businesses will also increase. (Rossman, 1999).

- Campus based learning will also thrive and expand to meet the educational and social needs of many Canadians attracted to a campus based education - especially those in the group of learners in the 18-24 year, full time education market. (Adelman, 1999)

- The cost and availability of communications and information technologies will continue to decrease and their use become more ubiquitous, thus allowing educational institutions an increasingly wide set of cost effective tools to use in a variety of combinations for on-line delivery. (Bates, 1995)

- On-line tools will allow combinations of video, text, computer simulations and audio presentations and interpersonal collaborations that are chosen on the basis of learner and teacher convenience, cost and educational effectiveness. (Burge & Roberts, 1998)

- Developments in pedagogy that harness new technologies to create powerful, active learning environments are critical to enhancing learning. (Jonassen,1996)

- The competitive advantage created by an institution's capacity to provide quality educational programming, both on campus and at a distance, will be the single greatest determinant of success or failure of higher education institutions. (Turoff, 1999)

Barriers to On-line Learning

Our assumptions about the strategic importance of on-line learning alternatives led us to examine perceived barriers to increased activity in this area. A recent survey of barriers to distance education completed by 815 education administrators and managers, found that five of the top ten barriers (from a survey set of 64 potential barriers) were directly related to social or political issues within the educational institution. These include:

Issue # 3	Organizational resistance to change
Issue #4	Lack of shared vision for distance education in the organization
Issue #6	Lack of strategic planning for distance education
Issue #8	Slow pace of implementation

Overcoming these barriers are challenges not to technology, nor directly to financial concerns, but rather speak to the need for visionary leadership and accompanying educational policy reform.

The next five issues identified by administrators are directly related to funding issues.

Issue #2	Lack of money to implement distance education programs
Issue #5	Lack of support staff to help course development
Issue #7	Lack of technical support
Issue #9	Faculty compensation, incentives, etc.
Issue #10	Lack of technology-enhanced classrooms, labs or infrastructure

(Berge & Muilenburg , 2000)

The number one barrier identified by all groups including faculty, support staff and administrators was perception of increased time requirements associated with the development and delivery of on-line education. We doubt that even the Ministers of Education are capable of creating "virtual time", but each of the other perceived barriers can be addressed by institutional and government based initiatives and incentives.

Organizational Models

The next section of this report details five organizational models for on-line l education – all of which already exist in some form in Canada. Our description includes a brief review of the features of the system, links to Canadian and international examples and a brief discussion of the administrative issues that are implicit in operation of these educational models.

Pan-Canadian consortia of existing institutions:

Description:

National consortia of Canadian universities are being established to gain economy of scale, share courses and provide a "single point" of entry for students or businesses seeking university or college level programming. These consortia initially focus their efforts on developing a comprehensive listing of members' available on-line courses and programs. By selectively including only programming from 'well-known and established Canadian institutions', the consortia attempt to both create branding and provide implicit or explicit guarantees of quality. These national consortia are currently at nascent stage of development. Each aspires to offer increased services including research and evaluation, student services, professional development and other services described in #4 below.

A key issue that differentiates on-line programming is the emphasis on group or individual learning. Garrison and Anderson (1999) differentiate between the "Little

Distance Education" systems often championed by more traditional dual mode[2] institutions and "Big Distance Education" systems practiced by single mode institutions and "mega-universities" (Daniels, 1996). The key variable that distinguishes conceptual models of distance education is the amount of human interaction prescribed in the learning sequences. Little Distance Education systems are sequenced and designed around group interaction. The interaction may be conducted in "real time" through audio or video conferencing or asynchronously through computer conferencing or voice mail servers. However, interaction of any variety requires some associated pacing and sequencing of group interactions. Big Distance Education systems increase scalability and accessibility by building systems in which students can start and progress at their speed. Big Distance Education systems thus decrease the necessity for group or collaborative engagement and focus on quality individualized experiences.

Learning can and does take place through solitary attentive study and reflection. The media of independent study can be as elaborate as interactive video or as simple as reading a study guide. However, for many learners and some types of content, learning must be deliberately cast in a social context. (Brown & Duguid, 2000). Literature on cooperative learning (Cabera et. al, 1998) and social cognition (Rogoff, 1990) confirms that much successful learning takes place within a learning community. Many skills and attitudes can be learned in individual mode, however many Canadians prefer to learn in a social environment. Both of these modes of learning (independent study and group interaction) can and should be available to learners studying on-line – there is room for both Big and Little Distance Education systems.

Examples:

Canadian Virtual University Canadian Virtual University/L'Université Virtuelle Canadienne (CVU) is a consortium led by two of Canada's 'single mode' distance education institutions - Athabasca University and British Columbia's Open Learning Agency.
Each of the six member institutions has a least one complete program (not just a series of courses), which they list in the joint database. It is planned that additional student support services will be linked to this common catalog of courses. These services could be expanded to provide the services of a "distance education portal" (see below). The Government of Alberta has contributed $75,000 per year for three years (renewable for a further two) in order to provide a secretariat for the CVU.

COHERE The Consortium of Higher Education Research Universities (COHERE) Group, a collaboration of leading Canadian research universities (initially led by the Universities of Waterloo, Alberta, Guelph and York), is developing a shared initiative to improve on-line learning experiences. These institutions seek to bring together the institutional research cultures with the momentum for on-line courseware, as joint agents of innovation. The goals of the COHERE consortia are to enhance offerings of on-line

[2] 'Dual mode' institutions offer both campus based and distance education programs, while 'single mode' institutions are dedicated solely to distance education delivery.

courses through co-operative programs, and to infuse research knowledge and attitudes into the development and teaching of on-line courses.

Issues

A Pan-Canadian consortium presents jurisdictional challenges that effect funding opportunities. Provincial governments have traditionally subsidized Canadian university programs. Regional taxpayers are not accustomed to paying a subsidy for students from other regions in Canada and especially students from other countries. A common solution is to price all on-line courses at "market value" – meaning that students pay 2-3 times higher for on-line courses than for equivalent campus-based courses. This not only makes it difficult to realistically cost both on-line and campus education but also creates conditions in which on-line courses are unable to compete financially with campus-based courses operating under high subsidy. This exaggerates the "digital divide" by providing access to on-line courses only to those individuals with high levels of disposable income, or those disciplines and employees perceived by corporate culture to be worthy of tuition subsidization.

Canadian universities are also being invited to join global initiatives related to on-line education. UBC, University of Toronto and McGill have joined the Universitas 21 consortium of 18 world renowned research universities in a consortia designed to develop international curriculum and provide quality assurance. Finally, UBC has joined 17 American "Research 1" Institutions in developing a database of on-line courses available from some of America's foremost research universities.

It seems clear that innovative universities and colleges will seize the opportunity to gain competitive advantage by creating collaborations with other public and private institutions. If we intend to create a distinctly Canadian context and "brand" Canadian on-line programming, we will have to be aggressive in supporting collaborations between Canadian institutions to enhance access to Canadian educational products and services.

A final issue relates to the many complexities and the cost of establishing collaborations and is detailed later in this report. It is still unclear how formal collaboration in a highly networked environment provides significant competitive advantage to participating institutions. The collapse of the California Virtual University (see Downes 1999) illustrates how the aspirations and capacity of the existing institutions to "go it alone" can circumvent efforts to provide collaborative programming and services.

Regional Consortia

Description:

There are a number of very successful consortia operating in Canada that are providing some of the most extensive support and delivery services for distance education in the world. These networks serve to integrate postsecondary institutions with community and often secondary education systems. Generally, they provide promotion, information

services, local community support, feedback connections and delivery networks, available for the delivery of programming from many institutions.

Examples:

Contact North/ContactNord (CN/CN): Headquartered in Sudbury Ontario, CN/CN has for 13 years provided student services in over 145 community learning centers many in isolated communities. CN/CN also provides a telecommunications network based on audio and video conferencing as well as various computer mediated communication tools. The International Council for Distance Education awarded to CN/CN in 1999 their Award of Excellence for Institutional Achievement in Distance Education. Recently, CN/CN has incorporated as a non-profit organization, with governing board members representing community and government stakeholders as well as institutional interests.

Alberta North: Alberta North is a consortium of seven postsecondary institutions in Northern Alberta. It provides courses, learner and instructor resources and a delivery network for use by the collaborating institutions. It also maintains Community Access Points in communities across Northern Alberta. Unlike CN/CN, Alberta North has not received significant provincial funding and has been forced to grow largely on contributions from the participating institutions. This has resulted in slower growth, fewer learning centers, but greater control and commitment from the collaborating institutions.

TeleEducation: Since 1993, TeleEducation New Brunswick has been providing courses from provincially funded universities colleges and secondary schools to 40 communities across New Brunswick. This regional network is unique in that it has explicitly focused on the creation of a knowledge-based economy by combining economic development goals with education and training goals. TeleEducation, through its Program Development Fund, has supported 37 on-line education development projects. Up to 50% of funding to a maximum of $100,000 is provided to support development of on-line programs or services. Unlike similar funds in other provinces, TeleEducation's funding has been awarded to both public sector institutions and private sector firms. The support of TeleEducation for both development and delivery of on-line programming has been a key impetus to a local educational software industry and has resulted in New Brunswick producing the highest per capita offering of on-line courses in Canada.

Issues:

These networks are differentiated from the national consortia of institutions (above) in a number of key areas. By definition, the programming and geographical base of the regional networks and most delivery is confined to a region. Thus, these networks have a direct call on public resources from the provincial government – the regional level of government charged with education provision. Second, most regional networks provide service to both colleges and Universities (and in some cases to secondary schools as well). Regional governments are more motivated to support and insure that educational

services are integrated with each other and with the geographic community in which they are located.

Network technologies are little constrained by the geographic boundaries that were used to establish Canada's public institutions and the regional networks established to enhance access to these resources. Thus, the regional networks are now forced to either support or compete against programming that originates outside their region.

The work of regional networks is often confounded by the vision and priorities of the multiple constituencies involved in their operations. The interests of provincial Ministries may be at odds with faculty or institutional priorities and both can be confounded by the wish of communities, businesses or individual learners.

Finally, most of Canada's regional networks have developed community learning centers for the delivery of programming as well as to serve as a physical community presence for distance education. The current generation of networked based tools is designed not for delivery to learning centers or classrooms, but to be capable of delivering directly to the home and business desktop. It is unclear how the role of the community access centers will change when delivery moves to the desktop. Government funders and the regional networks need to develop and assess current support models as result of this technologically induced change.

Regional networks offer a middle ground between institutions and communities that is, especially important for insuring local decision-making in educational planning. They also serve as training and development environments in which programming, organizational models and instructional strategy can be tested and refined. For these reasons provincial governments should continue to support the regional networks directly. They should insure that the interests of the regional economic system are adequately served, while allowing individual institutions and regional networks to develop partnership and relationships with other regional and national organizations – both internal and external to Canada. There is also a need for funding of discovery and dissemination of "lessons learned" over the past decade by Canada's Regional Networks. Means to accomplish this goal could include the sponsorship of conferences, development of knowledge management services and support for direct and indirect research on best practices.

A New National On-line Entity

Description:

This model involves the founding of a new national educational institution dedicated solely to on-line education offering certificate or degree programs consisting entirely of on-line courses. Structurally, the new on-line entity would resemble dedicated national, distance learning institutions such as India's Indira Gandhi National University or Britain's Open University. The new entity would hire academic staff to author courses, supervise on-line course delivery, and coordinate a network of teaching adjuncts. In

addition, course teams consisting of instructional designers, media specialists and editors would work with academic staff to develop high quality on-line programming.

Examples:

Technical University of British Columbia (Tech BC): Although not specifically designed as an on-line nor a national entity, Tech BC has a mandate to "excel in the flexible and innovative delivery of degree, diploma and certificate programs." (Tech BC Mission Statement). Tech BC is publicly funded and maintains a campus in Surrey, British Columbia. It offers three undergraduate programs centered around a common first year and graduate programs are proposed. Tech BC as a provincial organization is mandated to meet the education and training needs of British Columbia and only secondarily focuses on national educational priorities.

Walden University: A private university regionally accredited by the North Central Association of Colleges and Schools, Walden University offers Masters and Ph.D. programs in a wide range of disciplines. Founded in 1970 as a distance learning institution, Walden's faculty -- who are independently contracted -- and students work and interact in an on-line environment with minimal residency requirements.

UNexus: Based in New Brunswick, this private institution offers two MBA programs. Course delivery is completely on-line (though in-person testing is required in some courses) and there is no residency requirement. Faculty and Teaching Assistants are typically based at other institutions or companies and are contracted by UNexus. The University also has a credentialing agreement with Arthur D. Little School of Management in Boston and a delivery agreement with Karrox Technologies in Delhi, India.

Issues:

The major issue facing new on-line entities is credibility and all three institutions described above have entered into partnerships with existing institutions to offer degree programs in addition to offering their own degrees. Courses are taught by fully qualified faculty with the support of teaching assistants. Additionally, on-line institutions also establish credibility by requiring at least some residency (Tech BC and Walden) or some in-person testing (UNexus).

Even so, there needs to be some system or mechanism which will enable students, employers and other institutions to distinguish between credible and non-credible institutions and degree programs. Already there are more than 300 non-accredited 'universities' with combined earnings of more than $200 million per year (Bear 2000). Existing accreditation agencies are provincial or regional in nature. Legitimate on-line universities have a strong and vested interest in developing a widely recognized international system of recognition and accreditation.

Following the model of the "single-mode" distance learning institutions that preceded them, on-line institutions typically adopt a three-tiered staffing model. At the core is an administrative staff, responsible for providing student and academic support services. Course development and delivery is coordinated by a second layer consisting of credentialed academics. Finally, actual course delivery is supplemented through the use of teaching assistants or tutors.

This model raises a second issue as it tends to minimize the role played by academics in core university functions. Indeed, unless the institution receives substantial external funding (as at Tech BC), academic staff are usually based at other institutions or private businesses and contracted by the on-line institution. The production and delivery of on-line courses tends to become a team exercise, led by administrators, and the role of the academic is limited to that of the 'subject matter expert'. This "unbundling" of function which has already led to criticism (see Perley & Tanguay 1999). Very few on-line institutions will resist the temptation to offer courses world-wide, and some (such as UNexus) explicitly seek a global market. Additionally, such institutions will be increasingly tempted to recruit staff from around the world (as Walden and UNexus do). This raises a variety of issues (See Downes 2000). Institutions may be tempted to hire less expensive academics from overseas, for example. Accreditation and credentialing may become political tools used to protect the local job market.

On-line institutions operating in a global environment will also be tempted to homogenize content to satisfy the requirements of a mass audience. On the one hand, such a generic approach may be insensitive to regional differences, just as American textbooks are not sensitive to Canadian cultural realities. On the other hand, regional demands may shape the content and delivery of on-line education worldwide; institutions wishing to offer courses in China, for example, will by necessity, downplay issues regarding human rights or regional autonomy.

Finally, the issue of provincial versus national authority and responsibility for education is raised with any discussion of a new national university. Existing institutions will resist any new entry as they will perceive the new entity as a competitor for both government support and student registrations. However, on-line learning is not constrained by provincial (or even national) boundaries and thus there will be continuous pressure and opportunity for provincially funded institutions to compete on a national scale. The existing single mode distance delivery intuitions (TeleUniversite, Open Learning Agency – "Canada's Lifelong Learning Provider" and Athabasca University "Canada's Open University") are attempting to define themselves as national institutions – both individually and through collaborations such as the Canadian Virtual University. These distance education institutions are growing much faster than traditional universities. For example, Athabasca University reports growth rates of 79% since 1995-96 (23% in 1999-2000) (Athabasca University 2000) under the same financial restraints as other Alberta University that are experiencing less than 2% annual growth rates. Nonetheless, these institutions are still relatively small and highly unrepresented in the listing of research and development projects and grants that measure the important research and knowledge creation of the larger, traditional institutions.

A problem with a new national on-line institution and one which we find makes this model unacceptable, is the impact on the existing public institutions. Because new learning technologies will have a substantial impact on both traditional and distance learning, we believe that on-line learning should be integrated into both campus and distributed education at all existing institutions. Thus, the creation of a new institution with a distinct mandate for on-line education will serve to reduce motivation for active development in the existing institutions.

Canadian Portal for On-line Learning

Description:

A portal is a "an entry point or starting site for the World-Wide Web, combining a mixture of content and services and attempting to provide a personalized 'home base' for its audience." (Auburn University 2000) Portals for on-line learning address an audience of teachers and learners and contain contents and services related to on-line education.

Dozens -- perhaps hundreds -- of on-line learning portals have been launched in the last few years, so there is not any possibility of establishing a definitive on-line learning portal. Consequently, on-line learning portals tend today to establish niches for themselves as characterized by the following three models (see Downes 2000a).

The Restaurant Model - the portal lists course offerings by one institution. Like restaurants, the only brand present is the institution's, the only choices offered are from the institution's own catalogue. Production and consumption is localized. Marketing and advertising promotes the institutions own name and quality. The restaurant model is useful only in cases where prospective students have already selected an institution.

The Grocery Store Model - the portal acts as a broker or distributor for brand-name products in such a way that the store -- not the producers -- manages purchases and refunds, and the store -- more than the producers -- stands as the agent which ensures quality and price. The grocery store model is useful in cases where the prospective student has already decided to take a specific type of course but has not committed to a particular brand or institution.

The Community Model - the portal exists as one of a set of services offered to a specific interest-based community that is focused around a particular discipline, target group or geographic group. They typically provide interaction tools such as chats and on-line forums in addition to listing of links that are relevant to their courses (Masie 1999).

No matter which type of portal is employed, their relationship with educational institutions is similar. Institutions offer various on-line courses and programs that are catalogued and indexed by the portal site. Prospective students locate on-line courses through the portal site but enroll in the course directly through the provider institution. The on-line portal site may also provide registration, e-commerce, and articulation

services for students taking courses from a variety of institutions. Additionally, the portal may offer a wide range of student services such as career counseling, study skills and time management workshops, community and interaction.

Examples:

TeleCampus: This Canadian site arguably provides the world's largest searchable database of on-line courses. The site also provides a growing list of resources for students and faculty. Courses are listed by subject and by institution. Each course listing consists of a brief description and a link to the originating institution.

Hungry Minds: Hungry Minds acts as a broker and intermediary for existing on-line courses offered by traditional institutions. Focusing on brand name institutions, such as UC Berkeley and Penn State, Hungry Minds creates custom learning portals for corporate or industry groups. A course rating system is also in production.

MindEdge: Created by "pre-eminent educators from Harvard University and MIT," MindEdge is "a one stop destination that gives learners all the tools they need to search for, compare, and pre-register for the courses they want- whether they're right around the corner, or halfway around the world." The site provides course listings, news and event listings, and discussion forums.

Ethics Updates: Although very different from the portals listed above, Ethics Updates is an excellent example of the community model. It is designed primarily to be used by ethics instructors and their students and is intended to provide updates on current literature, both popular and professional, that relates to ethics. Although focusing mostly on conference, resources and events, the addition of course listings would require only a small change to the site.

Issues:

With thousands of educational institutions creating new courses and programs (or replacing old courses and programs), and with hundreds of educational portals listing some of all of these offerings, it becomes increasingly difficult to provide up to date listings. Academic staff do not have the time to submit their courses to hundreds of different portals, and portal staff do not have the resources to frequently consult thousands of educational institutions. A widely accepted system of automated updates is needed, perhaps modeled along the lines of emerging content syndication standards such as Rich Site Summary (RSS). (See Netscape 1999)

A second issue centers on the sustainability of educational portal sites. Such sites are sometimes expected to be self-supporting, however, with some few exceptions none are able to draw the millions of visitors required to generate significant advertising revenue. Alternative means of support, such as corporate sponsorships, government funding, or on-line transactions, will be needed to maintain educational portal sites. In each case,

educational portals may find themselves torn between the needs and desires of their funders and the needs and interests of their users.

Finally, there is no clear way for prospective students to locate and evaluate educational portal sites. When we consider the possibility that a community portal may be developed for each of hundreds of different topic areas and occupations, locating the best portal becomes a hit-or-miss prospect. There is a need for a more comprehensive 'portal of educational portals' to serve as a starting point or for powerful search and filter system which can located relevant resources from across the World Wide Web.

Partnerships between private on-line Enablers and Public Institutions

Description

The portal sites described in the previous section tend to exist in an arms-length relationship to educational institutions. While those portal sites provide course listings and links to educational institutions and on-line courses, and while they provide discussion, resources and other services for students, they do not provide any services related to the teaching of on-line courses themselves. We may distinguish, therefore, an additional class of services similar to educational portals but distinct in that they enter into an agreement with specific educational institutions for some or all aspects of on-line course delivery.

We call entities that provide services directly to institutions *on-line enablers*, and within this model a wide range of possibilities emerge. The on-line enabler may provide a very narrow service, such as on-line chat room or discussion board, or it may provide a comprehensive range of services up to and including actual course delivery. While in all cases the educational institution retains the academic function, providing subject matter expertise and even actual instruction, and while the on-line course or program carries the educational institution's brand, the on-line enabler provides what may be described as 'support' or 'peripheral' services.

In the future, learning Application Service Providers (ASPs) will provide any or all of the following: elaborate learning management systems that track student progress, on-line assessments, learning prescriptions, content server hosting and management, software rentals, and summary reports to training managers and students.

Examples:

UNext: UNext is a private company which collaborates and co-brands with leading institutions such as Columbia University, the University of Chicago, and Stanford University. Professors from contracted universities provide UNext with subject matter expertise and course vetting. Courses are offered on-line through Cardean University, a private on-line university established by UNext. And although graduates would not

receive a Stanford degree, UNext is able to use the Stanford brand to promote their courses. The university receives large royalties and stock options.

Pangea Network: Pangea provides a wide range of services to institutions offering on-line education. Basic services include a virtual campus, shared services, training support and marketing support. Optional services include course publishing, production and distribution, registration and admissions support, and custom consulting.

Issues:

Because working with an on-line education enabler is essentially a form of subcontracting a core academic function -- course delivery -- the issues that surround subcontracting in general apply to this model as well. While there is a history of universities subcontracting lesser functions, such as parking, security or even records management, it is not clear that the same arguments, such as cost savings and efficiency, can be applied to the actual delivery of on-line courses.

Counter to this is the argument that on-line learning enablers may be in a better position to develop and deliver on-line education solutions. An institution - especially a smaller institution - may not have the resources and expertise to develop a fully functional on-line education program. It might not have the skills required to develop and deliver on-line education, such as internet technology and multimedia production. Contracting with an enabler may turn a potential resource drain into a revenue generator.

Consider, for example, what happens at schools, colleges and universities when a new edition of some central software is released. These institutions incur a major expense and diversion of staff and resources to replacing, say, every instance of MS Word 5 with MS Word 6. Significant savings would be realized if software support was to be contracted to an application service provider who would provide automatic updates. Additionally, institutions employing application service providers would gain access to a much wider range of educational software creation and maintenance tools.

Partnerships with private entities carry risks, however. For example, academic staff at the University of Chicago have asked whether it is acceptable for an institution to sell its staff's academic work "and then hope to use it for high profits on Wall Street" (Bajoria and Wu 1999). The rights to staff publications and innovations have traditionally resided at least in part in the professors' hands. A broadly acceptable framework for 'course ownership' would have to be established before such a model could work on a wide scale.

Issues of Collaboration

All of the models proposed above are based upon increased collaboration and cooperation between the public and private educational institutions and businesses that constitute the Canadian adult learning system. This system has often not functioned as an integrated system; rather, individual institutions and provinces have been able to develop in the

solitude of geographic mandated 'catchment areas'. However, collaboration has long has been a component of distance education development and delivery.

The first obvious reason for such collaboration is the inherent economy of scale built into in many models of distance education. Many existing distance education systems are designed along 'industrial' models that increase production and delivery capacity using techniques of mass production and specialization (see Daniels, 1996). Programming designed and delivered for one audience can often be customized, delivered and supported for secondary or tertiary audiences at a much lower cost than creation of new programming.

Canadian distance educators have a fairly long and successful history of such collaborations. Until very recently, distance education has existed at the periphery of postsecondary culture and distance educators have often been forced to collaborate with partners in order to raise the capital, and expertise necessary to develop quality programming. Partnerships between mainline, campus based teaching departments are much fewer and generally have not been as successful. Moran and Mugridge (1993) document both Canadian and international projects focused on collaboration. The regional networks and the evolving collaborative organizations detailed earlier provide evidence of an ongoing interest by postsecondary institutions in mutual collaboration.

Despite the success of some collaborations, others have failed and most postsecondary institutions currently collaborate on only a small portion of the educational programming. Collaboration will have to increase as on-line programming exhibits a greater effect on the success and failure of individual educational institutions. To assist conceptual and theoretical thinking related to collaborative initiatives, we examine some of the theoretical bases for collaboration.

Much of the academic study of such collaboration is grounded in research on corporate partnerships, usually with medium to large sized corporations and thus findings need to be contextualized to the unique culture of postsecondary institutions. However, the increasing emphasis on business practice in regards to on-line course development and delivery may make studies from the business field increasingly germane to this context. The Australian scholars Cameron and Clarke (1996) summarize a variety of theories of collaborative endeavor including:

- *Political theory* - in which need for a shared vision and the need for transpartent and accountable decision making and operational structures,
- *Micro-economic perspectives* - in which the need to derive and realize business plans insure alliances result in healthy 'bottom lines' are stressed,
- *Strategic bridging theory* – in which the need to establish effective bridging organizations stress the need to integrate and in some cases arbitrate between partners in collaborative endeavors, and
- *Game theory* - in which the need to establish timely and accurate mechanisms to provide feedback and transparency regarding collaborative functions is necessary to insure that collaborating patterns can monitor and provide regular supportive guidance to collaborative ventures.

A brief application of these theories to the Canadian postsecondary context would seem to indicate that models of collaboration needed to meet the following criteria:

Link directly to strategic goals and aims
The extent of investment and redirection in established policy implicit in development and delivery of effective on-line programming creates a need to marshal resources from the institutional and governmental administrative and decision-making bodies. Continuing education units in the institutions may be useful for development of pilot projects and test beds, but are not capable of marshalling the necessary support and resources for allocating strategic aims and resources. Linking on-line development and delivery to strategic goals of the institutions and governments is critical to marshalling this support.

Provide evidence of sound business planning
Planning that shows how new revenues are generated and allocated (from both tuition and service provision) is critical for serious collaborative planning. Sound financial planning should be a normal prerequisite for any new ventures, however, in many post secondary institutions, the confusion of funding sources (government, tuition, research funding, donations etc.) has created a complex funding model, in which it is very difficult to cost out either distance or campus based delivery.

Demonstrate benefit to all potential members
Given the discrepancy in size and mandate of Canadian postsecondary institutions, it is difficult to create collaborative partnerships that equally meet the strategic and operational interest of all participants. Derived benefit must be as apparent to all collaborating partners as any reduction in domain or individual power. Mechanisms must be put in place so that cost and reward of participation is proportional to new or potential benefits.

Address credit transfer, lifelong learning and other credentialing issues
No issue is of more significance to both established educational institutions and emerging private and public sector educational institutions as the capacity to award credentials- especially college certificates, and university undergraduate and graduate degrees. The educational institutions have for some time played a subtle game with the professional institutions and trade organizations. In many professions the university offers the degree (law, medicine, education), while the professional body re-tests and certifies the applicant to practice the profession. Commercial credentialing institutions have begun offering professional accreditation in many areas of professional and technical knowledge. These range from offering credentials from vendor specific competence (Certified Microsoft Engineer) to professional certificates (Certified Web Master). In the future, a university or college education will only be one step in a life long learning experience. Face-to-face courses will be blended with on-line alternatives. Different phases of personal and professional life will dictate higher or lower participation rate in formal education. At different times provision of the opportunity for local, national, and international interpersonal relationships will be of more or less value. Residential campuses "away from the folks" will always hold an attraction – just as the ability to stay home with the

family and not commute or change residence will attract and, indeed, be a defining feature of educational choice for many 30 - 40 year olds.

Share resources and create bridging organizations
None of Canada's existing educational institutions offers programming that is broad enough to meet the on-line learning needs of all Canadians. Collaborations will need to be developed that allow for sharing of various components of quality education. These include student services, course production services, testing services, promotions and others services described later in this report. Collaborative projects often need third party bridging organizations that organize and provide these services on behalf of the collaborating organizations. The danger in creating such new organizations is that they require funding from the collaborating partners or new sources of revenue. There is a continuous centrifugal force at work, in which the partners are tempted to create or recreate these services themselves, under their own control, rather than relinquish this control to a third party.

Resolve copyright and ownership issues
The ownership and thus the right to buy and sell program, courses and learning objects that were created at public institutions is, in many cases, unclear. The capacity to develop collaborations based upon use, modification and reuse of educational content is very difficult when ownership issues are resolved.

Increased levels of collaboration are critical to the development of the Canadian adult education system. The guidelines above are substantiated in the specific proposals for stimulations described in the following section.

Strategies for Stimulating the On-line Education System in Canada

The following strategies are presented as recommendations for discussion. They originate from the review of the issues raised above and from the practical experience of the authors. All need to be subjected to cost/benefit projections and constituent support, but are provided as discussion items for the Committee.

1. A national request for proposal (RFP) for on-line programs

This strategy creates a development fund to 'kick start' production and delivery of education and training programs for which there is strong national demand. The rationale for national or collaborative funding by groups of provinces is that many on-line programs should be developed for both regional and national markets, if they are to be cost-effective. Such an RFP would be a form of targeted funding, designed like the Millennium Scholarships or Canadian Chairs programs, but focused on support of this important new way to provide educational opportunity. Criteria of such an RFP should include:

Review by knowledgeable peers
Submission of a medium to long-term business plan showing sustainability

Production of complete degree or certificate programming (still allowing for marketing of individual courses if desired)
Justification through evidence of needs analysis
evidence of skillful instructional design
Evidence of effective student support strategies
Evidence of research and evaluation strategies.

The RFP should be issued in two steps with seed funding for the development of complete proposals. The Fund should be designed as start-up funding paying for course development, promotion, training and recruitment of specialty staff and equipment. Each proposal should demonstrate how the program will be delivered on a cost recovery basis or be subsidized under regular provincial funding within a specified number of years.

It is unrealistic to expect cash-strapped institutions with no access to capital markets to provide significant funding for this development from normal revenues. Since 1994 in the USA $3.4 billion has been invested in e-businesses (Oblinger & Kidwell, 2000). Much of this funding has gone to develop, support and 'kick start' private providers. Public institutions need equivalent types of venture capital support to remain competitive and to create the new models of education that function best in a networked world.

2. Stimulating Consumer demand for on-line learning

Stimulating an increased demand will also foster the growth and development of on-line learning opportunities. The purpose of a 'pull' program is to increase students' willingness and ability to engage in lifelong learning. A 'pull' strategy would have two components:

a. A marketing strategy - an education and information campaign, perhaps modeled along the lines of the successful 'Participaction' campaign, will stimulate in Canadians a belief in the importance of lifelong learning. Such a campaign would highlight 'mental fitness' as the key to success in a changing economy. It would also highlight the unprecedented opportunities for learning in today's networked environment. It would suggest a variety of strategies to increase learning, ranging from traditional methods, such as reading a newspaper or visiting a library or museum, along with more current methods such as taking an on-line course, visiting an informational website.

b. An incentives strategy - through focused economic incentives, such a program would make it easier for students to pursue learning opportunities. Examples of such incentives include:

- tax deductions for non-traditional learning expenses
- vouchers provided to qualified participants (such as Employment Insurance recipients), redeemable for on-line or non-traditional learning programs
- tax credits and other incentives for employers willing to provide time and assistance for job training and educational programs

Learning incentive strategies exist in other domains; for example, Human Resource Development Canada has long funded upgrading or job training courses. This program would extend such initiatives to on-line education with an emphasis on providing

learning opportunities which do not infringe on a student's ability to seek or retain employment.

3. Ensuring Professional Competence

Canada's post secondary institutions are generally staffed by gifted, dedicated and intelligent professionals, trained to highest levels in their discipline. Rarely however, are they trained in, or regularly exposed to lessons from the science and art of instruction and teaching. Further, the reward structures for faculty are convoluted and often inadequate to reward and stimulate the innovation, evaluation, or dissemination characteristic of good scholarship of teaching.

The development of courses for on-line delivery often serves as a catalyst to reflective practice and conceptual change. Working with professional instructional designers in the development of educational programming with different constraints and opportunities allows faculty members to ask and re-ask important pedagogical and accessibility questions. Canada is recognized internationally for the professional development opportunities it provides, yet there are many faculty members who are profoundly suspicious and more damaging ignorant of the advantages and disadvantages of both on-line and campus based education.

A 1999 study of faculty workloads in Australia revealed that developing course materials for new technologies has had a major impact on the increasing work hours of faculty. "They are typically facing the demands of change in teaching with little or no formal training. Most learn as they go. About one third [have] had some training at the beginning of their careers and only a quarter had engaged in some professional development for teaching in the two years prior to the survey." (McInnis, 1999 p.xiv) Our experience suggests that workplace stress from rising expectations is as prevalent in Canada as reported in Australia.

A solution to this problem is to develop an effective credentialing scheme that supports training of academics as professional teachers. Such an approach has been developed in the United Kingdom where the 1997 National Committee of Inquiry into Higher Education ('Dearing Report') recommended that:

> Institutions of higher education begin immediately to develop or seek access to programmes for teacher training of their staff, if they do not have them, and that all institutions seek national accreditation of such programmes from the Institute for Learning and Teaching in Higher Education (ILT).
>
> Recommendation 13

ILT was founded in 1999 with the following activities:

- accrediting programmes of training in higher education;
- providing support for those engaged in facilitating learning and teaching;
- commissioning research and development in learning and teaching practice;
- stimulating innovation.

The ILT has accredited 47 certificate programs in higher education in Britain's public universities and polytechnic intuitions. A similar Canadian program could operate to improve education both on campus and on-line or could focus on the skills and attitudes necessary for successful on-line teaching.

4. Developing a National Network of Support Services

Both faculty and students would benefit from an easily accessible network of information and support. This strategy involves the construction and maintenance of a network of support services on the World Wide Web. The purpose of this network would be to provide quick access to informative, timely and relevant information, resources, guides and discussion relating to on-line teaching and learning.

In essence, a network of support services would be a portal site designed as a starting point for on-line students and faculty. Many such resources already exist on the World Wide Web; this site would collect and organize the best of them. An additional objective of this site would be to foster the discussion and interaction necessary to promote the development of on-line communities of on-line teachers and learners.

The support services strategy would have several major components:

a. *Teachers' Resource* - the focus of the teachers' resource would be to provide a one-stop source for all the tools, resources, and training needed to create and deliver on-line learning opportunities. Such a resource could include:

- Reports on current issues, such as intellectual property or mobile computing
- Learning modules covering topics such as on-line pedagogy, testing methods or discussion hosting
- A course and learning object database
- Illustration and discussion of on-line teaching 'best practices'
- Software reviews and repository
- Information exchange, discussion and community

b. *Students' Resource* - the focus of a students' resource would be to highlight learning opportunities, foster on-line learning skills, and to provide student support. Such a resource could include:

- A course database (or links to course and learning object repositories) and course reviews
- Credentialing, accreditation and articulation tables
- Listing and applications for financial aid opportunities
- Book stores and auctions
- Study skills, time management and other learning support modules and workshops
- Student counseling service
- Career tools, resume service, aptitude tests
- Consumer protection and budget management information

- Listing or links to an employment opportunities database
- Information exchange, discussion and community

c. *Administrators' Resource* – the focus of an administrators' resource would be to provide support and information related to the design and management of on-line education services. Such a resource could include:

- Credentialing information
- Advertising and promotion guides and resources
- Alumni and donor relations resources

5. Creation of Repositories of Educational Objects

A learning objects repository is a collection of educational materials available on-line for insertion into courses offered by a variety of institutions. The repository receives submissions from academic staff, publishers, and other producers of learning materials. They are reviewed and edited by review boards or referees. The repository catalogues and indexes these submissions, facilitating easy search and retrieval. The repository is designed to allow course authors from academic institutions to construct on-line course offerings by assembling sets of learning objects.

A repository of learning objects should not be seen as a replacement for either on-line or traditional courses. Rather, it serves as a common resource for teachers of similar subjects, in much the same way textbooks, maps or diagrams, and other instructional aids supplement traditional or distance learning courses today. Instructors using learning objects must place them into a context. Often, learning objects will be localized and supplemented with relevant examples. They must be presented to students in an environment of interpretation, discussion and reflection. A repository of learning objects is therefore best viewed as part of an overall learning infrastructure, along side other essential elements such as libraries, bookstores, communications technologies and physical plants.

Some examples of learning object repositories include:

Merlot: Merlot is a listing of interactive course objects submitted by member institutions and individual authors. The focus is on course components - sometimes called 'modules' or 'learning objects' that may be incorporated into larger courses. These course components are categorized according to discipline and level of difficulty and are subject to independent peer review.

Schoolnet: SchoolNet indexes learning resources in a variety of topic areas. In each topic area, a list of resources is displayed, each with a short description and a link to an external website. SchoolNet also provides metadata information for each resources and provides an advanced search using metadata. Each resource in a curriculum area is approved by a professional "pagemaster". Schoolnet also provides a database of learning objects in its Media Awareness Network.

MarcoPolo: Developed by MCI WorldCom, MarcoPolo offers a structured repository of educational materials for all subjects and all grades in the U.S. educational curriculum. The site is essentially a compilation of teaching resources from six well-known and respected educational and cultural institutions such as the National Geographic Society or the Kennedy Center. Material is categorized by grade level, and learning materials are matched to individual learning topics.

Despite the efforts of coordinating bodies such as IMS and ADL, there is still no widely implemented set of standards for learning objects. Thus, existing learning object repositories tend to be idiosyncratic, cataloging and indexing learning objects according to their own criteria. While a topic-based classification scheme may be relatively intuitive, they do not lend themselves to research and retrieval across multiple disciplines. In addition, localized schemes such as those developed to match U.S. curriculum guides, are region or domain specific and cannot be readily combined with resources form other local domains.

Additionally, despite the ongoing development of projects such as Microsoft's Learning Resource Interchange (See Microsoft 2000), there does not as yet exist a widely available platform for retrieving and assembling learning objects into courses. On the other hand, there is considerable industry momentum in that direction and we can predict the emergence of such tools in the next two years. (See Downes 2000b). Certainly, leading learning management software designers, such as WebCT or Blackboard, are promising IMS metadata compliance.

A learning object economy cannot function in isolation. Authors and design teams are required to create the learning objects themselves. Today, learning objects are created by professors and other academics on a relatively *ad hoc* basis. In the future, especially as payment models are established, we will likely see publishers and software companies assume a dominant role in learning object production as they do in textbook publishing. However, the accessibility and low entry level requirements of the Internet allow more diverse sorts of distribution models than the publishers' monopoly that dominates textbook production, marketing and distribution. Because learning objects will tend to embody much higher production standards and to incorporate more multimedia and programming, authors and design teams will need a wide range of skills and support technologies. Unless some level of support is provided for teachers and academics working in educational institutions, the primary authors of learning objects will be those publishers and software companies working towards mass markets and thus in a position to afford the initial investment required to produce sophisticated resources.

As mentioned above, professors and other academics will be required to assemble courses, supplement them with local flavour, and coordinate delivery. Instructors will need to learn to be able to use learning objects with the ease and flexibility they today display in their use of textbooks and library resources. This in turn implies that they will need to be able to retrieve and review learning objects in a timely manner. They will have

to be schooled in educationally effective means of incorporating them into their classes and of structuring class activities and discussions around them.

We are convinced that development of repositories of objects is critical to the improvement of both on-line and campus based education. Funding by the CANARIE Learning Program has recently provided matched initial funding for a number of repository based projects including the Broadband Enabled Lifelong Learning Environment (BELLE) and PORTAL For On-line Objects in Learning. These projects will be developing educational object repositories and the lessons learned will be useful in developing longer-term Canadian projects.

Finally, we cannot expect that all instructors will receive learning objects with enthusiasm. Learning objects may be viewed as a means of standardizing education, of replacing an instructor's individual point of view or teaching style with a homogenized 'one-size-fits-all' template. Learning objects may be viewed by many in the same way as television in the classroom was viewed by the previous generation: as a flat, dimensionless replacement for genuine teaching. It will be important therefore to provide information about learning objects in general and to provide examples of their use in such a way as to improve, and not sanitize, the educational experience.

6. Community Testing and Information Centers

This strategy strengthens and expands local community centers dedicated to encouraging and supporting life-long learning and ensuring community participation in its provision and support. There is some history of providing local or community-based support for distance learning and for internet access. Contact North, for example, provides logistics and support for a network of learning centers throughout northern Ontario. And Industry Canada's Community Access Program has fostered the development of internet access opportunities across Canada.

This strategy extends this idea, providing concrete 'on the ground' resources for on-line education. It focuses on providing local support for those aspects of learning best done in person. This makes it easier for institutions to offer a wider variety of on-line learning experiences, thereby increasing the likelihood that they would do so.

Local testing and information centres could:

- provide facilities and proctoring for tests and examinations. This addresses a major criticism of on-line education (and of distance learning in general), establishing its credibility and enabling graduates to feel more secure about the credibility of their credentials
- provide facilities for labs and hands-on work. Students often need to gain practical experience with advanced equipment and they occasionally need in-person support or supervision, especially when working with potentially dangerous chemicals or equipment.

While many such community learning centres already exist, this strategy would extend their reach across the country. This strategy could extend their capacity, either by increasing their size, their staffing component, or the equipment available. There is a need for increased coordination and research and a further need to promote the dissemination of best practices across the country.

The purpose this strategy is to enable local testing and information centres to act as a community resource for a variety of educational institutions. Instead of a local centre dedicated to supporting a certain institution's or region's distance and on-line courses, such a centre would provide support for a greater variety of Canadian educational institutions.

7. Competency based degrees and Prior Learning Assessment (PLA)

Credentialing for learning that occurs outside of the formal education system adds complexity to on-line education. On-line education is inclusive by nature, augmenting and assimilating learning experiences in any format. Networked learning thrives on fusing flexible, disaggregated aids and resources to support learning. By contrast, most formal campus-based education is an intentional integration of the five elements of students, faculty, administration, research and credit granting or warranting (Brown and Duguid, 2000). Warranting the program and the skills of the graduate are highly guarded components of the system. Often the credential is bundled with authentication of attendance and experience of the rich environment of a campus.

A second element of complexity arises from a philosophical debate about how best to measure learning outcomes. Do we measure the process of learning (difficult but perhaps more indicative capacity to undertake new learning challenges) or the outcomes of particular applications of the learning (much easier, but perhaps of limited transferability)? On-line instruction systems are often used as a means to demonstrate either of these philosophical approaches. On-line education can be evaluated in traditional ways through creation of papers, examinations and projects. Alternatively, on-line education can be used to assess learning competencies – often in combination with special purpose testing centers. Various commercial and public institutions have been created to offer testing and certification for such competencies- with or without the aid of formal instruction (see (Virtual University Enterprises (VUE)).

The ongoing acrimony between the Western Governors' University (WGU) and the traditional institutions in the western US region is evidence of this debate. The WGU has a policy of credentialing:

> "degrees and certificates based completely on competencies -- your ability to demonstrate your skills and knowledge on a series of assessments -- not on required courses. We make it possible for you to accelerate your "time to degree" by providing recognition for your expertise."
>
> WGU web site at www.wgu.edu

The WGU disaggregates credentialing from teaching, from peer groups, from formal research and from direct faculty control. It is likely that similar testing, coordination and student support services, backed by private and public sector support will be major players in Canada's adult education system.

Canadian educators have been grappling with this issue for years with some notable progress towards providing Prior Learning Assessment (PLA) tools and techniques - both on campus and on-line. The Human Resources Development Canada funded collaborations in Manitoba and Nova Scotia assist learners in "putting the pieces together" to create portfolios that document achievement of learning goals and objectives. The Open Learning Agency takes this support service on-line through the PLA On-line site. The Prior Learning Assessment and Recognition PLAR site provides resources and dissemination of research and best practices for professional educators dealing with this contentious issue.

Despite these positive efforts, more needs to be done to facilitate transition between the individual learner seeking credentialing for a wide range of skills and knowledge and the established institutions zealously guarding their own degree-granting capacity and simultaneously restricting the right of others to offer this function. Allowing for the disaggregation of teaching, student peers, facilities and degree- or credential-granting may, in the long term best serve both the private and public sector as the distinct values of each and of each combination, can be optimized and packaged to best meet diverse learning needs.

Conclusion

Each of the models and strategies described above embodies some aspect of a recommended approach to on-line education. Examples of each abound, suggesting that they all have some merit. By the same token, none of them represents the one best way to support on-line education. A comprehensive approach ought to incorporate elements from each model and strategy, choosing only those elements which best reflect the needs of the Canadian learning community.

A single omnibus strategy for managing and supporting on-line education is premature. Rather, it is important to provide opportunities for innovation, pilot projects, research and evaluation. Ironically, one of the most effective strategies for education systems to learn to use "disruptive technology" is to "fail early and inexpensively" (Archer, Garrsion and Anderson 1999). Failure and adjustment are necessary steps in the process of refining on-line education systems and techniques.

What these models and strategies will have in common – whether it is a collaboration which offers a wider range of programs to students in a remote location, or a learning portal offering prospective students a wide range of choices – is a shift in emphasis from the educational institution as provider of learning content to the existing and prospective students who use this content.

This shift in emphasis – what Paul Hoffert (1998) calls "the Bagel Effect" – is representative of a general trend driven by new technologies. It is a shift in focus from producers and suppliers of goods and services to the purchasers and consumers of goods and services. This trend is also expressed as a shift from institutions and centrally managed services to an environment of community and individual choice.

In such an environment, there are many suppliers and, as a consequence, purchasers or consumers are able to exercise choice. This, clearly, is the primary impact of an internet-based global education system. Because of this competition, a wide range of improvements filter through the system as a whole, including lower cost, increased personalization, better access and greater flexibility.

A choice-based market resembles most closely a market economy. However, a market economy benefits end-users only in an environment of abundance. Where a good or service is in short supply, reliance on a market economy will result in increased prices and restricted access. Thus, while it is true that some aspects of on-line education may be constructively left to market forces, in order to lower costs and increase access, other aspects of on-line education would benefit from innovative and focused support programs.

What, then, are the significant barriers challenging the development of Canadian on-line education today? These barriers are composed of the shortages that occur when there is a reliance on a market economy and have the potential to hinder the development of greater accessibility to on-line education. We find that they break down into three major categories:

Time: already engaged in the rigors of providing quality education, instructors and administrators find themselves hard pressed to find the time to learn and develop programming using new instructional technologies. While no government program can create more time, programs that help people better manage the time they have can address this deficiency. Programs, therefore, that reduce redundancy, improve access to resources, manage knowledge resources and streamline processes support the adoption of on-line education.

Knowledge: in today's rapidly changing information technology environment, it is increasingly difficult to stay abreast of current technologies and instructional methodologies. There is a pressing demand across Canada for greater expertise in new instructional technologies and on-line learning design. Programs which foster these and related skills would therefore go a long way toward encouraging the development of on-line education.

Money: to judge by the private market capitalization already in place to support on-line education, it would seem that money is not in short supply. But this investment is selective, focusing on profitable programs and corporate training. In other, less attractive, elements of education, money is in short supply. Private industry is less willing to invest

in what might be called social capital – general education, professional development for academic staff, and educational resources which can be used by all Canadians. Selective and focused public funding of what might be called an educational infrastructure will help support wider on-line education opportunities. Since there is no obvious benefit to commercial interests, this remains a focus which must rest in the hands of public funding entities.

Programs designed to support and foster on-line education, therefore, should support a wide array of models and strategies. They should draw from each of those models and strategies the elements that encourage the development and expansion of on-line education. At the same time, these programs should exhibit a narrow focus toward addressing the barriers of time, knowledge and money that stand in the way of achieving that objective.

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